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. . . there must first be the desire and determination, from top management down to the field level, to improve the visual quality of any development on public lands . . .

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I. Minerals management and its relationship to Visual Resources Management Program.

A. Introduction and objectives of presentation

1. Opportunity: Encourage involvement by VRM specialists to reorient from a recreation oriented mode to a surface protection and/or compliance (quality control) oriented mode.
2. Opportunity: Provide workshop participants with background information to understand when, how, and where to become involved in the minerals surface protection program.
3. Opportunity: Offer background and applicable insight that will enable VRM specialists to make reasonable and sound contributions to the surface protection and minerals compliance functions within their state, district, or resource area office.

B. Introduction to Bureau Minerals Management Program

1. Overview: FLPMA (76) established legislative demand for maintenance of environmental quality in all resource management activities . . .
 - a. According to the 1872 and 1920 mining laws, BLM must encourage development of Federal locatable mineral resources (consistent with all laws and regulations) . . . (a person has a statutory right).
 - b. BLM must provide free access for mineral entry, exploration, and development.
 - c. BLM is responsible under the 3809 regulations to prevent unnecessary and undue degradation.
 - d. Current BLM policy provides for exploration, extraction, and processing of all available domestic petroleum reserves.
2. BLM Wyoming and Montana Reorganization (graphic)

1. Minerals management and its relationship to Visual Resource Management Program

A. Introduction and objectives of presentation

1. Opportunity: Encourage involvement by VLM specialists in planning

from a recreation oriented mode to a surface protection and/or

compliance (quality control) oriented mode.

2. Opportunity: Provide workshop participants with background information

to understand when, how, and where to become involved in the

minerals surface protection program.

3. Opportunity: Offer background and applicable insight that will

enable VLM specialists to make reasonable and sound contributions

to the surface protection and minerals compliance functions

within their state, district, or resource area office.

B. Introduction to Bureau Minerals Management Program

1. Overview: BLM (19) established legislative demand for

maintenance of environmental quality in all Federal management

activities . . .

a. According to the 1972 and 1976 mining laws, BLM must encourage

development of Federal lands (including mineral resources)

(consistent with all laws and regulations) . . . (a person

has a statutory right).

b. BLM must provide free access for mineral entry, exploration,

and development.

c. BLM is responsible under the 1909 regulations to prevent

unnecessary and undue degradation.

d. Current BLM policy provides for exploration, extraction,

and processing of all available domestic petroleum resources.

2. BLM Working and Montana Reorganization

(Graphic)

3. WSO Surface Protection/Compliance Program

(graphic)

C. Visual Resources Management "From Recreation to Surface Protection"

1. Current program

- a. Conduct inventory
- b. Develop sensitivity
- c. Arrive at overall VRM classification
- d. Review EA's/EIS and make recommendations relative to the impact on visual resources
- e. Establish some mitigation
- f. Maybe monitor (on own initiative)

2. Proposed continuation of current program

- a. Visit on a pre-site evaluation (with compliance)
- b. Meet with operators, contractors, and plans of operation
- c. Make additional recommendations as conditions for approval for mining or exploration
- d. Monitor during construction
- e. Check upon completion of construction
- f. Check during operations
- g. Conduct or be in attendance during reclamation and abandonment meetings

II. BLM Minerals Management (Locatable and Leaseable) Activities

A. Locatable Minerals Program (43 CFR 3809)

1. Introduction/Background

- a. Purpose: Establish guidance and procedure to prevent unnecessary and undue degradation of Federal lands which may result from operations authorized by mining laws.

(Graphic)

II. Visual Resources Management "From Restoration to Surface Protection"

1. Current program

- a. Conduct inventory
- b. Develop sensitivity
- c. Review EA's/EIS and make recommendations relative to the impact on visual resources
- d. Establish some mitigation
- e. Monitor (on own initiative)

2. Proposed modification of current program

- a. Start on a pre-site evaluation (with compliance)
- b. Meet with operating, construction, and plans of operation
- c. Make additional recommendations as conditions for approval for mining or exploration
- d. Monitor during construction
- e. Check upon completion of construction
- f. Check during operation
- g. Conduct or be in attendance during reclamation and abandonment meetings

III. Visual Resources Management (Locatable and Leaseable) Activities

A. Locatable Minerals Program (43 CFR 1802)

1. Investigation/Design

- a. Purpose: Establish guidance and procedures to prevent unnecessary and undue degradation of Federal lands which may result from operations authorized by mining laws.

- b. Objectives: Provide for free access, mineral entry, exploration and location, operations, and purchase under mining laws in a manner that will not unduly hinder but assure that they are conducted in a manner not to cause unnecessary and undue degradation of Federal lands.
- c. Authority: FLPMA, 1976, surface management of public lands under U.S. mining laws.
- d. Definitions
 - (1) Casual Use: Operations which result in negligible disturbance and would normally require little or no reclamation--no explosives, no mechanized earth-moving equipment.
 - (a) Staking mining claim
 - (b) Prospecting/sampling with hand tools
 - (c) Less than two yards/hours using sluice washing or suction dredging
 - (d) Geophysical/geochemical
 - (e) Not including truck mounted drilling with portable mud pits
 - (2) Notice Level: Less than or equal to 5 acres disturbance
 - (3) Plan of Operations Activity: Greater than five acres disturbance
 - (4) Project Area: Area including access with one or more related operations.
 - (a) Same company in ridge or valley
 - (b) Drainage basin, same company
 - (c) Mine or mill complex with pond separate but close

Objectives: Provide for free access, mineral entry.

exploration and location, operations, and purchase under

mining laws in a manner that will not unduly hinder but assure

that they are conducted in a manner not to cause unnecessary

and undue degradation of Federal lands.

Authority: FLMMA, 1976, surface management of public lands

under U.S. mining laws

Definitions

(1) Casual Use: Operations which result in negligible

disturbance and would normally require little or no

mechanization--no explosives, no mechanized earth-moving

equipment.

(a) Staking mining claim

(b) Prospecting/sampling with hand tools

(c) Less than two yards/south side of road washing or

excavation dredging

(d) Geophysical/geotechnical

(e) Not including truck mounted drilling with portable

and pits

(2) Notice Level: Less than or equal to 5 acres disturbance

(3) Plan of Operations Activity: Greater than five acres

disturbance

(4) Project Area: Area including access with one or more

related operations.

(a) Same company in ridge or valley

(b) Drainage basin, same company

(c) Mine or mill complex with bond separate but close

- e. Policy: To encourage development of Federal locateable mineral resources consistent with existing laws and regulations. A person has a statutory right to enter upon unappropriated and unreserved Federal lands for mineral prospecting, exploration and development, and extraction of mineral resources. Responsible to prevent unnecessary and undue degradation

2. Mining Process (e.g., uranium)

a. Exploration

- (1) Pad (1-2 acres)
- (2) Access road
- (3) Reserve pit
- (4) Topsoil and overburden stockpiles

b. Mining (surface--open pit)

- (1) Access roads and utilities
- (2) Open pit
- (3) Plant site
- (4) Spoils (overburden), tailings, and topsoil stockpiles

c. Production

- (1) Roads
- (2) Utilities
- (3) Plant
- (4) Etc.

3. Regulations

a. Procedures: Receiving Notices and POOs

- (1) Date stamp and forward to appropriate specialist.
- (2) Specialist conducts a land status check to determine
 - (a) POO filed with appropriate office
 - (b) Status regarding mineral activity (open to mineral entry)

a. Policy: To encourage development of federal lands
 mineral resources consistent with existing laws and regula-
 tions. A person has a statutory right to enter upon
 unappropriated and unreserved Federal lands for mineral
 prospecting, exploration and development, and extraction of
 mineral resources. Responsible to prevent unnecessary and
 undue degradation

2. Mining Process (e.g., uranium)

a. Exploration

- (1) Pat (1-5 years)
- (2) Access road
- (3) Reentry pit
- (4) Tunnel and overburden stripping

b. Mining (surface-open pit)

- (1) Access roads and utilities
- (2) Open pit
- (3) Waste pile
- (4) Reentry (underground), tailings, and waste rock

c. Production

- (1) Waste
- (2) Tailings
- (3) Plant
- (4) Etc.

3. Reclamation

a. Procedures: Reclaiming Surface and FOS

- (1) Base camp and forward to appropriate specialist.
- (2) Specialist conducts a land status check to determine
 (a) FOS filed with appropriate office
 (b) Status regarding mineral activity (open to mineral
 entry)

- (c) If notice was filed, determine if P00 is needed.
- (d) If closed to mining, return to State Office for recordation, adjudication, and appropriate action.
- (3) Log in each notice and P00, enter on an overlay.
- (4) Fill out Form 1274-7 by records clerk.
- (5) Make certain all information required on notice is included.

b. Procedures: Processing Notices

- (1) Confirm operations are under five acres total disturbance in one calendar year, submitted all needed information.
- (2) Unnecessary or undue degradation will result?
- (3) Inside cuts equal to or greater than three feet or other consultation needed?
- (4) Operator cannot commence for 15 days after receipt.
- (5) Forward case file to area manager for review.
- (6) Endangered species, cultural, paleontological not required.
- (7) If review surfaces a problem, 3809.2-2(e) is in order.
- (8) Letter acknowledging receipt of NOI and completeness.
- (9) Complete at least one compliance check of operation.

c. Procedures: Processing P00 (30 days plus 60 days extension)

- (1) Subject to unnecessary and undue, district manager shall approve any operations necessary for timely compliance with those requirements of federal and state laws, e.g., assessment work.
- (2) Acknowledge receipt of P00--minerals, compliance, or clerk.
- (3) Look for DEQ file number--their review.
- (4) Identify if P00 is an exact duplicate of that on file with DEQ (certified letter or stamp/sign).

(4) If notice was filed, determine if FOC is needed.
(5) If closed to mining, return to Waste Office for
reconsideration, adjustment, and appropriate action.

(3) Log in each notice and FOC, enter on an overlay.
(4) Fill out Form 1334-1 by waste site.
(5) Make certain all information requested on notice is
included.

b. Procedures: Processing Notices

(1) Conflicting operations are under 1334 series local disturbance
in one calendar year, submitted all needed information.
(2) Unnecessary or undue degradation will result?
(3) Inside case equal to or greater than three feet or other
consideration needed?

(4) Operator cannot commence for 15 days after receipt.
(5) Forward case file to area manager for review.
(6) Redesignated operator, cultural, paleontological not required.
(7) If review outlines a problem, 1334.2-1(e) is in order.
(8) Letter acknowledging receipt of NOI and compliance.
(9) Complete at least one compliance check of operation.

c. Procedures: Processing FOC (30 days plus 60 days extension)

(1) Subject to unnecessary and undue, District manager shall
approve any operations necessary for timely compliance
with those requirements of Federal and State laws, e.g.,
management work.
(2) Acknowledge receipt of FOC-minerals, compliance, or other.
(3) Look for 300 title number--their review.
(4) Identify if FOC is an exact duplicate of that on file
with BLM (identified letter or memorandum).

- (5) Review and determine if P00 meets requirements 3809(1-5).
- (6) If deficient, notify State Office and DEQ.
- (7) If ok, forward to area manager for short EA.
- (8) Request input from wildlife and archeologist.
- (9) Complete EA, area manager provides plan approval.
- (10) Recommendations for mitigation and/or minor alterations in P00 are incorporated (modifications).
- (11) Send these modifications relative to unnecessary and undue degradation to State Office and DEQ.
- (12) Within 30 calendar days the operator must be notified:
 - (a) Plan is approved or proposed action would cause unnecessary or undue degradation to proposed lands.
 - (b) Modifications needed prior to approval.
 - (c) Additional 60(-) days are needed to review (for public interest, public comments, inaccessible for inspection or EIS must be processed by EPA (30 days), ^{National Historic preservation Act} section 106, or section 7 of Endangered Species Act).
 - (d) Shoot for 15 days review time.
- (13) The only action acceptable for rejection or P00 is the violation with endangered species (section 7).
- (14) Complete one compliance inspection per year.
- (15) Upon request of DEQ and/or operator, we complete rehabilitation inspection. If in compliance with P00, release DEQ bond. Must review completeness of rehabilitation stuff in P00.
- (16) No approval until BLM has complied with section 106 of National Historic Preservation Act or section 7 of Endangered Species Act (only justification for rejection of P00).

- (2) Review and determine if FOD meets requirements 3809(1-5).
- (3) If deficient, notify State Office and NEP.
- (4) If ok, forward to area manager for short EA.
- (5) Request input from wildlife and archeologist.
- (6) Complete EA, area manager provides plan approval.
- (7) Recommendations for mitigation and/or other alternatives in FOD are incorporated (modifications).
- (8) Send these modifications relative to unnecessary and undue degradation to State Office and NEP.
- (9) Within 30 calendar days the operator must be notified:
 - (a) Plan is approved or proposed action would cause unnecessary or undue degradation to proposed lands.
 - (b) Modifications needed prior to approval.
 - (c) Additional 60-90 days are needed to review (for public interest, public comment, infeasibility for inspection of EIS must be provided by EPA).

Noted with comments 4-7
 - (10) days, section 106 or section 7 of Endangered Species Act.
- (11) 30-day for 15-day review time.
- (12) The only action acceptable for rejection or FOD is the violation with endangered species (section 7).
- (13) Complete the compliance inspection per year.
- (14) Upon request of NEP and/or operator, we complete rehabilitation inspection. If in compliance with FOD, release NEP bond. Next review compliance of rehabilitation state in FOD.
- (15) No approval until EIS has complied with section 106 of National Historic Preservation Act or section 7 of Endangered Species Act (only justification for rejection).

d. Environmental Assessments and Protection

- (1) An EA must be prepared for each POO--minimal in nature.
- (2) Encouraged to develop areawide EA's.
- (3) Use EA to develop mitigation alterations for unnecessary and/or undue degradation or additional reclamation
- (4) Extend EA review by extending BLM review to 60 days.
- (5) Casual Use--operations must be conducted so as not to cause unnecessary and undue degradation.
 - (a) Operators must notify regarding cultural resources encountered and they must be left intact. BLM will bear costs of salvage.
 - (b) Operator may expedite 30-day process by hiring archeologists approved by the BLM (not necessary).
 - (c) Endangered species review must be completed in 30 days.
 - (d) Finding of no unnecessary and undue degradation.

e. Bonding

- (1) As per the cooperative agreement, will not usually be required.
- (2) Unless BLM deems necessary due to past noncompliance.
- (3) BLM can inspect at any time, however, DEQ is key inspector.
- (4) Several kinds of bonds will be accepted
 - (a) Individual cash bond.
 - (b) Cash deposited in Federal depository account.
 - (c) Negotiable U.S. securities (FR Circular 570).
 - (d) Corporate surety bond approved by Treasury Dept.
 - (e) Blanket bond covering entire state.

4. Environmental Assessment and Protection

- (1) An EA must be prepared for each FWC-mineral in nature.
- (2) Encouraged to develop available EA's.
- (3) Use EA to develop mitigation alternatives for unnecessary and/or undue degradation or additional restrictions.
- (4) Extended EA review by consulting FWC review to 60 days.
- (5) Casual Use--operations must be conducted so as not to cause unnecessary and undue degradation.
- (a) Operations must notify regarding critical resources encountered and they must be left intact. FIM will bear costs of salvage.
- (b) Operator may expedite 30-day process by filing amendments approved by the FIM (not necessary).
- (c) Expedited review must be completed in 30 days.
- (d) Filing of an unnecessary and undue degradation.

5. Bonding

- (1) As per the cooperative agreement, will not usually be required.
- (2) Unless FIM deems necessary due to past noncompliance.
- (3) FIM can request at any time, however, SED is not inspector.
- (4) Several kinds of bonds will be accepted:
 - (a) Individual cash bond.
 - (b) Cash deposited in Federal depository account.
 - (c) Negotiable U.S. securities (25 percent SED).
 - (d) Corporate surety bond approved by Treasury Dept.
 - (e) Blanket bond covering entire state.

- (5) An increase in bonding requirement may occur at any time.
- (6) Can also be decreased following reclamation.
- (7) Bonding default--result of notice of noncompliance.

(a) District manager can request from State Office and Regional Solicitor's Office.

(b) Regarding failure of operator to take action.

f. Plan Modifications (DEQ-SO-DM-SO-DEQ)

- (1) Operator may modify his P00 at any time during operations.
- (2) District manager can request operator to do so (prevent unnecessary and undue degradation).
- (3) A significant modification will be handled as a new P00.
- (4) All changes will be routed from operator to State Office to districts or from district manager to State Office to DEQ to operator.
- (5) 30 days to furnish and/or review a P00 modification.
- (6) If operator does not make a modification at request:
 - (a) 30 days to do so.
 - (b) District manager asks State Office to contact operator.
 - (c) State Office reviews request for 30 days regarding necessity of modification.
 - (d) State Office contacts operator and DEQ . . . unnecessary/undue.
 - (e) If modification not necessary, informes district manager and operator.

g. Reclamation Requirements

- (1) Required under casual use, notice level, or plans of operations.
- (2) Reasonable reclamation measures are to be initiated if undue/unnecessary damage remains.

- (3) An increase in bonding requirements may occur at any time.
- (4) Can also be decreased following reclamation.
- (5) Bonding date--transfer of notice of noncompliance.
- (6) District manager can request from State Office and Regional Solicitor's Office.
- (7) Requiring failure of operator to take action.

1. The Modification (20-20-20-20)

- (1) Operator may modify his FOG at any time during operations.
- (2) District manager can request operator to do so (prevent unnecessary and undue degradation).
- (3) A significant modification will be handled as a new FOG.
- (4) All changes will be routed from operator to State Office to determine or from district manager to State Office to operator.
- (5) 30 days to furnish notice for review & FOG modification.
- (6) If operator does not make a modification at request:
 - (a) 30 days to do so.
 - (b) District manager asks State Office to contact operator.
 - (c) State Office review request for 30 days regarding necessity of modification.
 - (d) State Office contacts operator and FOG.
 - (e) If modification not necessary, inform district manager and operator.

2. Reclamation Requirements

- (1) Required under current law, notice level, or plans of operations.
- (2) Reasonable reclamation measures are to be initiated if

- (3) Reshaping once--maximum (state standards apply).
- (4) Revegetation^{not} more than twice.
- (5) District manager will help with technical guidance.

h. Noncompliance

- (1) Failure to file notice or P00 or conduct operations under such notice or plan is subject to noncompliance notice.
- (2) Can be enjoined from the continuation of operations by court order.
- (3) Responsible for the reclamation of disturbed areas disturbed prior to the filing of notice of P00 (liable).
- (4) Notice of noncompliance: letter from district manager to DEQ detailing specific violations and stating that corrective actions must be taken within a specific time period.
- (5) Certified mail to State Office to DEQ.
- (6) Monitors noncompliance by district manager.

i. Access

- (1) An operator is entitled to reasonable access across Federal land.
- (2) Includes necessary pipelines, transmission, and support facilities.
- (3) Notice or P00 must specify access routes and alignments.
- (4) District manager can require use of existing roads and appropriate maintenance.
- (5) Operator is responsible for public safety, etc.
- (6) Does not control access--from district manager, public.
- (7) Inspections will usually be coordinated with DEQ.

- (3) Emergency case--action (extra standards apply).
- (4) Investigation--more than twice.

(5) District manager will help with technical guidance.

Noncompliance

- (1) Failure to file notice of POC or conduct operations under such notice or plan is subject to noncompliance notice.
- (2) Can be enjoined from the continuation of operations by court order.

- (3) Responsible for the resolution of disturbed areas.
- (4) District prior to the filing of notice of POC (if any).
- (5) Notice of noncompliance. Letter from district manager to DSI detailing specific violations and stating that corrective actions must be taken within a specific time period.

(6) Certified mail to State Office to DSI.

(7) Monitor noncompliance by district manager.

Access

- (1) An operator is entitled to reasonable access across Federal land.
- (2) Includes necessary pipelines, transmission, and support facilities.
- (3) Notice of POC must specify access routes and alignments.
- (4) District manager can require use of existing roads and appropriate easements.
- (5) Operator is responsible for public safety, etc.
- (6) Does not control access--from district manager, public.
- (7) Inspections will usually be coordinated with DSI.

j. Appeals

- (1) All appeals shall be sent by district manager to the State Office within three working days.
- (2) State Office will process them in 30 days.
- (3) District manager--State Office--IBLA?

k. Confidentiality

- (1) Use of this data will be done in an expeditious manner and then returned unduplicated to its source.
- (2) Include trade secrets; confidential or privileged information, commercial or financial information will be kept separate from the notice and cited rather than appended.
- (3) Public information: operator's name, location of operations on Federal land, type of activity proposed, etc.

4. Locatable Minerals Program, 43 CFR 3809

a. Opportunities for VRM Input

- 1) Development of overall exploration stipulations.
- 2) Under NOI for mining exploration (10 days).
- 3) During actual exploration (not much input).
- 4) Upon receipt of a Plan of Operations.
- 5) During compliance inspections of existing operations (during reclamation).
- 6) Upon abandonment and bond release inspection.

B. Saleable Minerals Program

* No details.

C. Leaseable Minerals Program, 43 CFR 3109

1. Introduction - Background

- a. More surface disturbance in Wyoming than all other mineral activity combined.
- b. Purpose: to implement Secretary Order 2948 and MMS and BLM cooperative agreements (WO Inst. Memo 75-568) pertaining to onshore oil and gas operations.

- (1) All appeals shall be sent by registered mail to the State Office within three working days.
- (2) State Office will process them in 30 days.
- (3) District manager--State Office--HLSA

Confidentiality

- (1) Use of this data will be made in an appropriate manner and then returned unpublished to the agency.
- (2) Include trade secrets, confidential or privileged information, commercial or financial information will be kept separate from the notice and filed rather than appended.
- (3) Public information: Operator's name, location of operation on Federal land, type of activity proposed, etc.

A. Locatable Minerals Program, 43 CFR 3402

a. Opportunities for FWS input

- (1) Development of overall exploration stipulations.
- (2) Input FWS for initial exploration (10 days).
- (3) During actual exploration (not each input).
- (4) Upon receipt of a Plan of Operations.
- (5) During compliance inspections of existing operations (during reclamation).
- (6) Upon abandonment and post-reuse inspection.

B. Salable Minerals Program

* No details.

C. Leasehold Minerals Program, 43 CFR 3102

1. Introduction - Background

- a. More surface disturbance in BLM than all other mineral activity combined.
- b. Purpose: to implement Executive Order 12045 and 12165 cooperative agreements (50 USC, 12045-12046) pertaining to minerals and gas operations.

- c. Objective: to assure adequate protection through proper surface protection efforts. The Bureau must identify impacts and develop proper surface protection measures to minimize adverse effects to the environment.
- d. Authority:
- (1) Revised Statute 2478 (43 USC 1201).
 - (2) Act of February 25, 1920 (41 Stat. 437), as amended.
 - (3) Act of August 7, 1947 (61 Stat. 913), as amended.
 - (4) Section 402, Reorganization Plan No. 3 of 1946 (60 Stat. 1099).
 - (5) Other special leasing acts.
 - (6) The National Environmental Policy Act of 1969 (83 Stat. 852).
 - (7) Federal Water Pollution Control Act, amendments of 1972 (Public Law 92-500).
 - (8) Antiquities Act of 1906 (34 Stat. 225).
 - (9) Historic Sites Act of 1935 (49 Stat. 666).
 - (10) National Historic Preservation Act of 1966 (80 Stat. 915).
 - (11) Clean Air Act 42 U.S.C. 1857, et seq.) of 1963 as amended.
 - (12) Occupational Safety and Health Act of 1970.
- e. Definitions:
- (1) Preliminary Environmental Review (PER)
 - (a) Joint conference between BLM, MMS, the operator, and his contractors on the proposed location with the purpose of resolving problem areas identified during the initial phases of preapplication.
 - (b) A review of the proposed access, location of the drilling pad, and support operations are conducted during the PER.

c. Objectives: To assure adequate protection through proper surface protection efforts. The Bureau must identify impacts and develop proper surface protection measures to minimize adverse effects to the environment.

d. Authority:

- (1) Federal Statute 3075 (41 USC 1201)
- (2) Act of February 22, 1930 (41 Stat. 417), as amended.
- (3) Act of August 7, 1947 (61 Stat. 813), as amended.
- (4) Section 402, Reorganization Plan No. 3 of 1946 (40 Stat. 1099).
- (5) Other Federal laws.
- (6) The National Environmental Policy Act of 1969 (81 Stat. 903).
- (7) Federal Water Pollution Control Act, amendments of 1972 (Public Law 92-500).
- (8) Antiquities Act of 1906 (34 Stat. 225).
- (9) National Forest Act of 1906 (34 Stat. 225).
- (10) National Wildlife Refuge Act of 1906 (34 Stat. 225).
- (11) Clean Air Act 42 U.S.C. 1857, et seq. (as amended).
- (12) Geological Safety and Health Act of 1970.

e. Definitions:

- (1) Preliminary Environmental Review (PER)
 - (a) Joint conference between EIS, NEP, the operator, and his contractors on the proposed location with the purpose of resolving problem areas identified during the initial phase of investigation.
 - (b) A review of the proposed action, location of the drilling and, and support operations are conducted

- (2) Application for Permit to Drill (APD)
 - (a) Includes a permit and plan of development that is filed with MMS.
 - (b) It should also include a written agreement between the lessee and the surface owner.
- (3) Multipoint Surface Use and Operations Plan (NTL-6)
 - (a) Contain statement of the plan (NTL-6) of action to be taken by the lessee.
 - (b) This includes all developmental as well as surface protection measures that are being proposed by the lessee.
 - (c) 13 point plan.

2. Mining Process

a. Geophysical Exploration

- (1) Seismic
 - (a) Shot (subsurface).
 - (b) Shot (surface).
 - (c) Vibratory.
- (2) Gravity.
- (3) Magnetic.

b. Location Construction

- (1) Pioneer road.
- (2) Scraper strips and stockpiles topsoil.
- (3) Construct location.
- (4) Build reserve pit (lined with colloidal clay--about three barrels per foot drilled).

c. Drill Well (rotary)

- (1) Place substructure and hoist derrick into place.

(2) Application for Permit to Drill (APD)

(a) Includes a permit and plan of development that is

filled with HSE.

(b) It should also include a written agreement between

the licensee and the surface owner.

(3) Surface Use and Operations Plan (SULOP)

(a) Contains statement of the plan (SULOP) of action to be

taken by the licensee.

(b) This includes all developments as well as surface

protection measures that are being proposed by the

licensee.

(c) Is a plan.

2. Mining Process

a. Geophysical Exploration

(1) Seismic

(a) Shot (subsurface)

(b) Shot (surface)

(c) Vibratory

(2) Gravity

(3) Magnetic

b. Location Construction

(1) Planned road

(2) Survey staking and staked topography

(3) Location location

(4) Drill reserve pit (filled with collapsed clay--about

three barrels per foot drilled)

c. Drill Well (Drill)

(1) Place subsurface and water service from drill

- (2) Place pipe, draw works, and engines in substructure.
- (3) Mud tanks, mixing house, fuel tanks, etc.
- (4) When drilling activity begins with 125,000 gallons
(30,000^{BB}) of water in reserve pit.
- (5) Rat and miscellaneous holes are spudded.

d. Production

- (1) Flush production (christmas tree).
- (2) Tanks and/or flowlines.
- (3) Pump (pump jack and submersible).
- (4) Acidizing/fracturing/liquid condensates.
- (5) Reclamation for operation.

e. Production field maintenance

- (1) Roads
- (2) Locations
- (3) Equipment (painting)
- (4) Etc.

f. Reclamation for Abandonment

- (1) Equipment removal and cleanup.
- (2) Total recontouring.
- (3) Revegetation.

3. Regulations/Manual

a. Exploration (3045) regulations

- (1) Need for consultation.
- (2) Responsibilities.
- (3) Practices to be followed.
- (4) Drill hole plugging.
- (5) Reclamation.

- (5) Place pipe, draw works, and engines in substructure.
- (6) Mud tanks, mixing house, fuel tanks, etc.
- (a) When drilling activity begins with 125,000 gallons
 (30,000) of water as reserve pit.

(7) Rat and miscellaneous holes are plugged.

4. Production

- (1) Flush production (Christmas tree).
- (2) Tanks and/or flowlines.
- (3) Pump (pump jack and submersible).
- (4) Acidizing/fracturing/liquid condensates.
- (5) Reclamation for operation.

5. Production field maintenance

- (1) Roads
- (2) Structures
- (3) Equipment (paving)
- (4) Etc.

6. Reclamation for Abandonment

- (1) Equipment removal and cleanup.
- (2) Final recontouring.
- (3) Revegetation.

7. Regulations/Manual

a. Exploration (1965) regulations

- (1) Need for consultation.
- (2) Responsibilities.
- (3) Practices to be followed.
- (4) Drill hole plugging.
- (5) Reclamation.

b. Leasing

(1) Secretarial Order 2948

- (a) Establishes MMS as the lead agency for production.
- (b) BLM is responsible for leasing and surface protection.
- (c) BLM is especially interested in the multipoint plan.

(2) MMS-BLM cooperative procedures

- (a) Work together on production maintenance. BLM must go through MMS for operator.
- (b) MMS is generally responsible for downhole and production operation.
- (c) BLM is generally responsible for surface management/protection (only on Federal surface).

(3) Lease stipulations

- (a) Ten standard stipulations (see copy).
- (b) BLM is responsible for them.
- (c) OSHA standards.

(4) Retrieval overlay concept (planning base map)

- (a) Aids in identifying critical values for lease stipulations and APD processing.
- (b) Assists in development of additional stipulations.
- (c) Opportunity for all resource input

(5) Spacing

- (a) State Oil and Gas Commission establishes.
- (b) >10 acres (oil) - 640 acres (gas).
- (c) Two hundred foot window for site-specific movement of location.

c. Preparation for drilling

(1) Preliminary environmental review.

- (a) Consultation.
- (b) Bio assessment.

(2) APD

(1) General Order 1948

- (a) Establishes WMS as the lead agency for production.
- (b) BLM is responsible for leasing and surface protection.
- (c) BLM is especially interested in the wildlife plan.
- (2) WMS-BLM cooperative procedures
 - (a) Work together on production maintenance. BLM must go through WMS for permits.
 - (b) WMS is generally responsible for downhole and production operation.
 - (c) BLM is generally responsible for surface management, protection (only on Federal lands).

(3) Lease stipulations

- (a) The standard stipulations (see copy).
- (b) BLM is responsible for them.
- (c) OSHA standards.
- (4) Wetland overlay concept (planning base map)
 - (a) Aids in identifying critical values for lease stipulations and APD processing.
 - (b) Aids in development of additional stipulations.
 - (c) Opportunity for all resource input.

(5) Planning

- (a) State Oil and Gas Commission stipulations.
- (b) 410 acres (oil) - 500 acres (gas).
- (c) Two awarded foot window for site-specific movement of location.

2. Preparation for drilling

(1) Preliminary environmental review

- (a) Consultation.
- (b) Site assessment.

(2) APD

Oil and Gas Lease Stipulations
(to deal with specific situations)

1. All of the land in this lease is included in (recreation or special area, etc.). Therefore, no occupancy or disturbance of the surface of the land described in this lease is authorized. The lessee, however, may exploit the oil and gas resources in this lease by directional drilling from sites outside this lease. If a proposed drilling site lies on land administered by the Bureau of Land Management, a permit for use of the site must be obtained from the BLM District Manager before drilling or other development begins.
2. No access or work trail or road, earth cut or fill, structure or other improvement, other than an active drilling rig, will be permitted if it can be viewed from the road, lake, river, etc.).
3. No occupancy or other activity on the surface of (legal subdivision) is allowed under this lease.
4. No occupancy or other surface disturbance will be allowed within _____ feet of the _____ (road, trail, river, creek, canal, etc.). This distance may be modified when specifically approved in writing by the District Supervisor, Minerals Management Service, with the concurrence of the District Manager, Bureau of Land Management.
5. No drilling or storage facilities will be allowed within _____ feet of (live water, the reservoir, etc.) located in legal subdivision. This distance may be modified when specifically approved in writing by the District Supervisor, Minerals Management Service, with the concurrence of the District Manager, Bureau of Land Management.
6. No occupancy or other surface disturbance will be allowed on slopes in excess of _____ percent, without written permission from the District Supervisor, Minerals Management Service, with the concurrence of the District Manager, Bureau of Land Management.
7. In order to (minimize watershed damage, protect important seasonal wildlife habitat, etc.) exploration, drilling, and other development activity will be allowed only during the period from _____ to _____. This limitation does not apply to maintenance and operation of producing wells. Exceptions to this limitation in any year may be specifically authorized in writing by the District Supervisor, Minerals Management Service, with the concurrence of the District Manager, Bureau of Land Management.
8. In order to minimize watershed damage during muddy and/or wet period the District Manager, Bureau of Land Management, through the District Supervisor, Minerals Management Service, may prohibit exploration, drilling or other development. This limitation does not apply to maintenance and operation of producing wells.
9. The _____ (trail/road) will not be used as an access road for activities on this lease.
- * 10. To maintain esthetic values, all semi-permanent and permanent facilities may require painting or camouflage to blend with the natural surroundings. The paint selection or method of camouflage will be subject to approval by the District Supervisor, Minerals Management Service, with the concurrence of the District Manager, Bureau of Land Management.

Sage Grouse Habitat

"No occupancy or other surface disturbance will be allowed within a 1,320-foot radius of the center of a sage grouse strutting ground (lek). No exceptions to this will be granted. In order to protect the nesting area around the strutting ground, exploration, drilling, and other development activity will be allowed within a 1 3/4-mile distance from the 1/4-mile lek protection zone only during the period June 15 to March 1. Exceptions to the monthly limitations in any year may be specifically authorized in writing by the District Supervisor, Minerals Management Service, with the concurrence of the District Manager, Bureau of Land Management."

(a) Multipoint surface use and operations plan
(13 point plan).

(b) Refer to oil and gas retrieval overlay.

(c) Develop stipulations.

(d) Meet with operator, MMS, contractors, etc.

(e) Consider access, location, archeology, rehabilitation,
etc.

(f) Send copy of amended APD to MMS.

(3) Sundry notices

(a) Subsequent plans of development.

(b) Intent to abandon.

(c) Report of abandonment.

(4) Opportunities for VRM involvement

(a) Upon receipt of NOI for geophysical exploration.

(b) During leasing (preleasing) phases, e.g., Cody-
Washakie EIS).

(c) During PER phase

(1) Oil and gas retrieval overlay.

(2) Personal review.

(3) Presite (if exists).

(d) APD Phase

(1) Upon review of 13 point plan.

(2) During onsite.

(3) Developing initial or additional stipulations.

(4) Working with other specialists and operator.

(e) Construction supervision phase.

(f) Notice of completion.

(g) During production.

(h) Upon receipt of notice for abandonment.

(a) Multipoint surface use and operations plan
(1) point plan.

(b) Refer to oil and gas retrieval survey.

(c) Develop stipulations.

(d) Meet with operator, HSE, contractors, etc.

(e) Consider access, location, technology, rehabilitation,

etc.

(f) Send copy of awarded APB to HSE.

(3) Security matters

(a) Subsequent plans of development.

(b) Intent to abandon.

(c) Report of abandonment.

(a) Opportunities for VCM involvement

(a) Upon receipt of NOI for geophysical acquisition.

(b) During leasing (preleasing) phase, e.g., only-

Washita EIS).

(c) During PER phase.

(1) Oil and gas retrieval survey.

(2) Personal review.

(3) Review (if exists).

(4) APB phase

(1) Upon review of 13 point plan.

(2) During review.

(3) Developing initial or additional stipulations.

(4) Working with other specialists and operator.

(a) Construction supervision phase.

(1) Notice of completion.

(2) During production.

(h) Upon receipt of notice for abandonment.

III. Planning and Design Considerations

A. General Planning System

B. Environmental Considerations

1. Overview and intent

- (a) General comments--EA's only document impact.
- (b) EAs and EISs are commonly program - not technologically oriented.
- (c) Must develop a technical feedback system.
- (d) Monitoring/accuracy of predictions and stipulation effectiveness.

2. EA process (graphic)

- (a) Traditional input.
- (b) More desirable input.

3. Develop a monitoring program.

- (a) Form (attached).
- (b) Class input.

C. Stipulations Versus Operating Standards

1. General comments.

- (a) Stipulations versus standards.
- (b) Difficulties with stipulations.
- (c) Application and monitoring.
- (d) Who is responsible?

2. General design principles and stipulations

- (a) Adjust location.
- (b) Minimize surface disturbance.
- (c) Mimic elements of the adjacent or acceptable natural landscape.

3. Class Exercise.

111. Planning and Design Considerations

A. General Planning System

B. Environmental Considerations

I. Overview and Intent

- (a) General comments--EA's only document input.
- (b) EA and EIS are necessary program - not technologically oriented.
- (c) Must develop a technical feedback system.
- (d) Monitoring/accuracy of predictions and stipulations effectiveness.

2. EA process (graphical)

(a) Traditional input.

(b) More desirable input.

I. Developing a monitoring program.

(a) Data (attached).

(b) Class input.

C. Stipulations Versus Operating Standards

I. General comments.

(a) Stipulations versus standards.

(b) Difficulties with stipulations.

(c) Application and monitoring.

(d) Who is responsible?

2. General design principles and stipulations

(a) Adjust location.

(b) Minimize surface disturbance.

(c) Minimize elements of the adjacent or acceptable natural landscape.

I. Class Exercise.

COMPLIANCE INSPECTION

Type of Case _____ Serial # _____

Permittee _____

CONDITION OF AREA - REMARKS

RECOMMENDATIONS FOR REMEDIAL ACTION

REMARKS ON STIPULATIONS

Have predicted impacts occurred? Yes ☒ No ☐ Additional Impacts? Yes ☐ No ☐

Can any stipulations be eliminated without increasing impacts? Yes ☒ No ☐

Have the stipulations been effective in reducing or eliminating impacts? Yes ☒ No ☐

Could stipulations be modified to be more effective? Yes ☐ No ☐

Remarks: _____

RECOMMENDATION: Close the case ☐ Future compliance inspection needed - date _____
Accept proof of construction ☐ Future routine inspection - date _____

Inspector Signature _____ Title _____ Date _____

WY-06-2800-01 (Jan. 1982)

16a

Type of Case

Serial #

Inspector

LOCATION OF AREA - REMARKS

RECOMMENDATIONS FOR REMEDIAL ACTION

REMARKS ON STIPULATIONS

Have predicted impacts occurred? Yes ☐ No ☐ Additional impacts? Yes ☐ No ☐

Can any stipulations be eliminated without increasing impacts? Yes ☐ No ☐

Have the stipulations been effective in reducing or eliminating impacts? Yes ☐ No ☐

Could stipulations be modified to be more effective? Yes ☐ No ☐

Remarks:

RECOMMENDATION: Close the case ☐ Future compliance inspection needed - date

Accept proof of construction ☐ Future routine inspection - date

Inspector Signature

Title

Date

IV. On the Ground Implementation of Planning and Design Principles

A. Large Scale Projects (Rehabilitation Booklet)

1. General preplanning

- (a) Prior to "Rehab" there was no documented procedure for preplanning or rehabilitation planning for oil and gas.
- (b) Provide a basis for data collection with written recommendations.
- (c) Process
 - (1) Inventory slope, soils and vegetation, water resources, and wildlife habitat.
 - (2) Identify three levels of biophysical sensitivity for each resource value.
 - (3) Document how each level of biophysical sensitivity modifies the proposed land uses of a given area (i.e. severe slopes limit kind and amount of disturbance acceptable in a particular situation).
 - (4) Map these criteria on a 1:24,000 scale topo map or orthophoto (environmental composite).
 - (5) Delineate and map the visual resource values and public sensitivity levels.
 - (6) Overlay the environmental composite and the visual resources composite maps to generate an Environmental Sensitivity Overlay.
 - (7) This tool can then be utilized as a means to establish priorities needed in evaluating natural resource values in the area for predevelopment or rehabilitation planning.

2. Rehabilitation Planning (define)

- (a) Conduct the following inventory in cooperation with the operator and an MMS representative.
- (b) Develop a series of "Sector Base Maps." This tool identifies all surface disturbances present in a given area, e.g., unitized oil and gas field.

4. Large Scale Projects (Rehabilitation Projects)

1. General principles

- (a) Prior to "Rehab" there was no documented procedures for engineering or rehabilitation planning for oil and gas.
- (b) Provide a basis for data collection with written recommendations.
- (c) Process
 - (1) Inventory ridge, soils and vegetation, water resources, and wildlife habitat.
 - (2) Identify those levels of physical sensitivity for each resource value.
 - (3) Document how each level of physical sensitivity modifies the proposed land uses of a given area (i.e., severe slopes limit kind and amount of disturbance acceptable in a particular situation).
 - (4) Map these criteria on a 1:24,000 scale map or orthophoto (environmental composite).
 - (5) Determine and map the visual resource values and public sensitivity levels.
 - (6) Overlay the environmental composite and the visual resource composite maps to generate an Environmental Sensitivity Overlay.
 - (7) This tool can then be utilized as a means to establish priorities needed in evaluating natural resource values in the area for development or rehabilitation planning.

2. Rehabilitation Planning (Rehab)

- (a) Conduct the following inventory in cooperation with the operator and an NPS representative.
- (b) Develop a series of "Sector Data Maps". This tool identifies all surface disturbances present in a given area, e.g., outlined oil and gas fields.

(c) Process (page 47, "Rehabilitation")

- (1) Divide the entire unit into manageable sized sector maps (8½ x 11") at the 1:24,000 scale.
- (2) Use aerial photos, etc., to begin entering the type, degree, and extent of surface disturbing activities on the maintenance and rehabilitation log provided.
- (3) Make these entries on the sector maps also.
- (4) All disturbances must fall into either a maintenance or rehabilitation category of problems.
 - (a) Maintenance problem is one that must be eliminated to enjoy continued use ~~M~~(M).
 - (b) Rehabilitation problem is one that must be eliminated in order to arrive at acceptable reclamation, (R).
- (5) Classify all disturbances according to their state of rehabilitation.
 - (a) Totally rehabilitated--erosion and sedimentation are controlled and vegetation is returning.
 - (b) Partially rehabilitated ~~P~~(P)
 - (c) Unrehabilitated ~~U~~(U)
- (6) Determine cause of problem and identify and document solution alternatives.
- (7) Identify the type of disturbance.
 - (a) P = pipeline.
 - (b) R = road.
 - (c) L = location.
- (8) Using the matrix (page 50), determine the priority number for a given disturbance and enter it on the log.

(1) Divide the entire site into manageable sized sector maps

(2) x 11" at the 1:14,000 scale.

(3) Use aerial photos, etc., to begin sketching the type

degree, and extent of surface disturbing activities on

the map, and rehabilitation log provided.

(4) Note these features on the sector map also.

(5) All disturbances must fall into either a maintenance

or rehabilitation category of problem.

(a) Maintenance problem is one that may be eliminated

in early continued use.

(b) Rehabilitation problem is one that must be

eliminated in order to attain an acceptable

rehabilitation.

(6) Classify all disturbances according to their state of

rehabilitation.

(a) Totally rehabilitated--erosion and sedimentation

are controlled and vegetation is returning.

(b) Partially rehabilitated

(c) Unrehabilitated

(7) Determine cause of problem and identify and document

solution alternatives.

(8) Identify the type of disturbance.

(a) R = pipeline.

(b) R = road.

(c) L = location.

(9) Using the matrix (page 50), determine the priority

number for a given disturbance and enter it on the log.

(9) Fill in remainder of log with kind of problems and recommended rehabilitation measures (use graphics where appropriate).

(d) Rework and organize log book into two categories, rehabilitation and maintenance.

3. Conduct Final Field Inventories

- a. Evaluate accuracy (with MMS and operator).
- b. Draft final recommendations on base map to attach to maintenance and rehabilitation logs.
- c. Agree upon an action-oriented timeframe within which these projects can be completed by the industry.
- d. Hold semiannual meetings to reevaluate progress.

B. Visual and Engineering Concerns on Site Specific Linear Disturbances

1. Roads

- a. General design goals of permanent road.
 - (1) Form must express function.
 - (2) Pleasing appearance.
 - (3) Fit into their surroundings.
 - (4) Become visually acceptable components of landscape when viewed from outside.
 - (5) Safely transfer travelers from one place to another.
- b. Design principles to keep in mind. Roads should:
 - (1) provide variety.
 - (2) Capitalize on the best features of the landscape.
 - (3) Fit the country without excess cut and fills.
 - (4) Have disturbances (scars) recontoured and revegetated with appropriate plantings.

(9) Will be considered of low kind of problems and

recommended rehabilitation measures (see graphic above)

photographs.

(10) Present and proposed low bank into two categories, rehabilita-

tion and maintenance.

1. Conduct Visual Field Investigations

a. Evaluate scenery (with WBS and operator).

b. Draft Visual Recommendations on base map to attach to

maintenance and rehabilitation logs.

c. Agree upon an action-oriented statement within which these

projects can be completed by the industry.

d. Hold regular meetings to coordinate progress.

2. Visual and Engineering Concepts on Site Specific Visual Problems as

1. Goals

a. General design goals of permanent road.

(1) Form must express function.

(2) Pleasing appearance.

(3) Fit into their surroundings.

(4) Become visually acceptable components of landscape

when viewed from outside.

(5) Safely transfer travelers from one place to another.

b. Design principles to keep in mind. Goals should:

(1) provide variety.

(2) contribute to the best features of the landscape.

(3) fit the country without excess cuts and fills.

(4) Have distinctive (natural) resources and vegetation

with appropriate plantings.

- (5) Should appear smooth and continuous with some feeling of predictability (no severe bumps and kinks).
- (6) Appear in proper scale with its surroundings.
- (7) Be protected from future erosion problems.
- (8) Provide for adequate drainage.
- (9) Have good coordination of the vertical and horizontal alignments.
- (10) Preserve as much of the unimpacted countryside as possible.

c. Engineering considerations--roads.

- (1) Adequate width and loadbearing capacity.
- (2) Proper slopes and turning radii.
- (3) Appropriate (curve widening and sight distances).
- (4) Acceptable grades.
- (5) Proper culvert placement and installation.
- (6) Adequate drainage.
- (7) Appropriate surfacing.
- (8) Winter/spring maintenance.

d. Road standards. *opportunity*

- (2) Should appear smooth and continuous with even feeling of finishability (no severe bumps and blisters).
- (3) Appear in proper scale with the surroundings.
- (4) Be protected from future erosion problems.
- (5) Provide for adequate drainage.
- (6) Have good construction of the vertical and horizontal alignment.
- (7) Preserve as much of the original topography as possible.

c. Engineering considerations--roads.

- (1) Adequate width and load-bearing capacity.
- (2) Proper slope and roadway width.
- (3) Adequate (provide widening and sight triangles).
- (4) Adequate grades.
- (5) Proper culvert placement and installation.
- (6) Adequate drainage.
- (7) Adequate surfacing.
- (8) Adequate lighting maintenance.

d. Road standards--appearance.

2. Flowlines

a. Alignment selection considerations (assuming buried).

- (1) Point to point.
- (2) Federal lands.
- (3) Existing right-of-way (50'-100' wide).
- (4) Proximity to services (highways, towns, etc.).
- (5) Small changes to reduce dirtwork costs, etc.

b. Concerns along right-of-way (construction).

- (1) Overall width.
- (2) Accurate alignment identification.
- (3) Clearing and grading operation.
- (4) Adequate topsoiling (no mixing).
- (5) Trenching operation (kinds of equipment).
- (6) Additional roads planned (turn-arounds).
- (7) Major dirtwork in addition to trenching.
- (8) Stringing, boring, bending, and welding operations.
- (9) Drainage and wetland crossings.
- (10) General construction monitoring.

c. Concerns along right-of-way (cleanup and reclamation).

- (1) Backfilling/compaction.
- (2) Recontouring.
- (3) Erosion control (water bars).
- (4) Motor vehicles.
- (5) Scarification/final grading.
- (6) Seeding.
- (7) Monitoring and maintenance.

a. Alignment selection considerations (assuming parties)

- (1) Point to point.
- (2) Federal lands.
- (3) Existing right-of-way (50'-100' wide).
- (4) Proximity to services (highways, towns, etc.).
- (5) Small changes to reduce dirtwork costs, etc.

b. Concrete along right-of-way (construction).

- (1) Overall width.
- (2) Accurate alignment identification.
- (3) Clearing and grading operation.
- (4) Adequate topsoiling (no mixing).
- (5) Trenching operation (kind of equipment).
- (6) Additional roads placed (turn-arounds).
- (7) Major dirtwork in addition to trenching.
- (8) Stringing, boring, bending, and welding operations.
- (9) Drainage and wetland crossings.
- (10) General construction monitoring.

c. Concrete along right-of-way (cleanup and restoration).

- (1) Backfilling/construction.
- (2) Recontouring.
- (3) Erosion control (water bars).
- (4) Motor vehicles.
- (5) Seeding/limb grading.
- (6) Seeding.
- (7) Monitoring and maintenance.

C. Visual and Engineering Concerns on Site Specific Nonlinear Disturbances

1. Locations and other drilling pads.

a. Reserve pits.

- (1) One half inch cut material.
- (2) Keyed dike.
- (3) On up-slope side of well head.
- (4) Sealed.
- (5) Not to be squeezed (prior to dry-up).

b. Access roads.

- (1) On compacted fill or cut.
- (2) To meet BLM standards on producing location.
- (3) Properly graded and surfaced.

c. Topsoil.

- (1) Stockpiled (adequate volume).
- (2) Identified.
- (3) Not mixed with subsoil.
- (4) Should stockpile acceptable subsoil if topsoil volumes are inadequate.

d. Other permanent production equipment.

- (1) Locate on no cut/no fill line.
- (2) Proper OSHA distances.
- (3) Painted proper noncontrasting color.

e. New design for locations (Van Pool).

f. Proper rehabilitation.

- (1) Recontour slopes, etc.
- (2) Ensure revegetation success.

2. Tank batteries/storage yards, etc.

- (a) Consider location (variable).
- (b) Reduce surface disturbances.

C. Visual and Engineering Concerns on Site Specific Wetland Disturbances

1. Locations and other drilling data.

a. Borehole data.

(1) One half inch core material.

(2) Logged data.

(3) On up-slope side of well head.

(4) Sealed.

(5) Not to be released prior to dry-up.

b. Access roads.

(1) On compacted fill or soil.

(2) To meet BLM standards on production location.

(3) Property owned and adjacent.

c. Topsoil.

(1) Stockpiled (adequate volume).

(2) Identified.

(3) Not mixed with subsoil.

(4) Should be available acceptable subsoil if topsoil volume

is inadequate.

d. Other permanent production equipment.

(1) Located on an existing well line.

(2) Proper OSHA clearance.

(3) Painted proper neutralizing color.

e. New design for locations (see pool).

f. Proper identification.

(1) Recession signs, etc.

(2) Signs re-vegetation success.

2. Tank batteries/storage yards, etc.

(a) Contained location (various).

(b) Reduce outside disturbances.

- (c) Establish definite timeframe with bond or land use permit rental.

V. Reclamation Techniques

A. Theory.

1. Return land to equal or higher than its previous use.
 - a. Conduct an inventory to evaluate and document what actually exists on the site, e.g., species list, soil analysis, topographic data, and establish a series of control plots.
 - b. Determine if that is the most desirable land use.
2. Surface Water Control.
 - a. Plant moisture.
 - b. Erosion/deposition control.
 - c. Weathering.
 - d. Leach salts.
3. Soil Conditions.
 - a. Adequate topsoil.
 - b. Soil/water relationships.
 - c. Increase in infiltration.
 - d. Reduction in runoff.
 - e. Root penetration.
4. Revegetation.
 - a. Micro-climatic conditions.
 - b. Reduced runoff/better infiltration.
 - c. Soil development.
 - d. Reduced erosion.
 - e. Addition of organic material.

B. Dirtwork Techniques.

1. Equipment.

- * Motor patrol.

Research

Research Techniques

1. Theory

1. Establish land use equal or higher than the previous use.
2. Establish an inventory to evaluate and document what actually exists on the site, e.g., species list, soil analysis, topographic data, and establish a series of control plots.
3. Determine if there is the most desirable land use.

2. Surface Water Control

- a. Plant material.
- b. Erosion/vegetation control.
- c. Weir/ditch.
- d. Beach area.

3. Soil Conditions

- a. Address control.
- b. Soil/water relationships.
- c. Increase in infiltration.
- d. Reduction in runoff.
- e. Root penetration.

4. Vegetation

- a. Micro-climate conditions.
- b. Reduced runoff/soil infiltration.
- c. Soil development.
- d. Reduced erosion.
- e. Addition of organic material.

5. Research Techniques

1. Equipment

* Motor patrol

a. Dragline.

- (1) Primarily used for stripping and excavation.
- (2) Very expensive and requires a high degree of skill.
- (3) Needs flat operating platform.
- (4) Usually inverts overburden.

b. Rippers.

- (1) Fracture or break apart surface compaction and rock.
- (2) Attached to crawlers, motor graders, etc.
- (3) Does not prepare adequate seedbed.

c. Scrapers.

- (1) Remove and segregate topsoil (prior to stripping).
- (2) Haul and load overburden.
- (3) Used for compaction.
- (4) Size disadvantage.
- (5) High cost (single engine scrapers need a pusher).

d. Dozer.

- (1) Basic regrading, shaping, and/or clearing tool.
- (2) Most widely used, most utilitarian and flexible.
- (3) Can move only a small amount of dirt at once.
- (4) Often results in excessive soil compaction.
- (5) Limited to 20 percent grades or less.
- (6) Wheeled dozers exert greater ground pressure than crawler mounted dozers.

e. Front-end loader.

- (1) Dig, load, and haul overburden.
- (2) Versatile and able to work on grades up to 20 percent.
- (3) Some stability problems.
- (4) Not economical on long hauls (greater than 700 feet).

- (1) Primarily used for stripping and excavation.
- (2) Very expensive and requires a high degree of skill.
- (3) Needs flat operating platform.
- (4) Usually inverts operation.

b. Scraper.

- (1) Functions on draft, earth surface compaction and rock.
- (2) Attached to crawler, motor grader, etc.
- (3) Does not require adequate roadbed.

c. Motor grader.

- (1) Remove and regrade material (prior to stripping).
- (2) Soil and load overburden.
- (3) Used for compaction.
- (4) Size disadvantage.
- (5) High cost (static engine operators need a number).

d. Dozer.

- (1) Basic grading, shaping, and/or clearing tool.
- (2) Most widely used, most versatile and flexible.
- (3) Can move only a small amount of dirt at once.
- (4) Often results in excessive soil compaction.
- (5) Limited to 30 percent grades or less.
- (6) Wheeled dozers exert greater ground pressure than crawler mounted dozers.

e. Front-end loader.

- (1) Big, load, and haul overburden.
- (2) Versatile and able to work on grades up to 30 percent.
- (3) Good stability problems.
- (4) Not economical on long hauls (greater than 500 feet).

- f. Contour furrow.
 - (1) Breaks up compacted soil, forms furrows, and broadcasts seeds.
 - (2) Works on slopes up to 30 percent.
 - (3) Not durable in rocky soils.
- g. Off-set discs.
 - (1) Breaks surface compaction.
 - (2) Prepares seedbed.
 - (3) Does not relieve deep compaction problems.
- h. Klodbuster/disc-rake.
 - (1) Prepares steep slopes for seeding.
 - (2) Is dragged along behind tractor.
 - (3) Not effective on slopes less than five percent or slow speeds (less than 5 mph).
- i. Gouger.
 - (1) Makes depressions in soil.
 - (2) Increases soil moisture, reduces runoff.
 - (3) Used on slopes to 20 percent.
- j. All wheel drive tractor.
 - (1) More power, better tractor.
 - (2) Not well suited for steep terrain.
 - (3) Excess soil compaction on wet soil.
- k. Brush rake.
 - (1) Piles brush; scarifies soil.
 - (2) Rake prohibits scraping or blading soil.
- l. Auger Backfiller.
 - (1) Pulverizes and returns soil in order of excavation.
 - (2) Does not compact.
 - (3) Works effectively on gentle slopes.

Common Error

(1) Means of compacted soil, loose footings, and sidewalks

needed.

(2) Works on slope up to 30 percent.

(3) Not suitable in rocky soils.

Off-set ditch.

(1) Areas surface compaction.

(2) Properly needed.

(3) Does not relieve deep compaction problems.

Knobbed-in-trench.

(1) Properly steep slopes for seating.

(2) Is damaged along behind tractor.

(3) Not effective on slopes less than five percent or slow

speeds (less than 2 mph).

Grader.

(1) Heavy depressions in soil.

(2) Increased soil moisture, reduces tractive

(3) Used on slopes to 30 percent.

All wheel drive tractor.

(1) More power, better tractor.

(2) Not well suited for steep terrain.

(3) Excess soil compaction on wet soil.

Brush rake.

(1) Better brush, scattered soil.

(2) Safe procedure scraping or blading soil.

Auger backfiller.

(1) Pulverizes and returns soil in order of excavation.

(2) Does not compact.

(3) Works effectively on gentle slopes.

2. Recontouring.

- a. Mimic natural land forms (premining).
- b. Work to get positive drainage.
- c. Have all drainages enter and exit at pre-existing grade.
- d. No side casting or escarpment spoiling.
- e. Construction of terraces, water bars, and diversion ditches at the proper location and functionally correct.
 - (1) Contour terraces.
 - (2) Diversion ditches.
 - (3) Water bars.

3. Soil preparation.

- a. Ripping.
- b. Scarification.
- c. Top soiling.
- d. Subsoiling.
- e. Surface preparation.
 - (1) Gouging.
 - (2) drainage.
 - (3) Harrow/clod buster.
 - (4) Culti-packing.
- f. Stockpiled topsoil must be reseeded.

C. Revegetation Techniques.

1. Equipment.

- a. Land imprinter.
 - (1) Creates a series of geometric patterns on the ground to trap moisture.
 - (2) No tillages required.

2. Recontouring.

- a. Remove material from (preexisting).
- b. Work to get positive drainage.
- c. Have all drainage enter and exit at pre-existing grade.
- d. No side casting or overbank spilling.
- e. Construction of terraces, water bars, and diversion ditches at the proper location and functionally correct.
- (1) Concrete terrace.
- (2) Inverted ditch.
- (3) Water bar.

3. Soil preparation.

- a. Ripping.
 - b. Scarification.
 - c. Top soiling.
 - d. Subsoiling.
 - e. Surface preparation.
 - (1) Grading.
 - (2) Drainage.
 - (3) Harrow/seed basket.
 - (4) Cult-packing.
- f. Stockpiled topsoil must be resampled.

C. Fertilization Techniques.

1. Equipment.

- a. Land injector.
- (1) - Creates a series of granular patterns on the ground to trap moisture.
- (2) No tillage required.

- (3) Can treat slopes up to 45 percent.
 - (4) Can not adequately treat in brushy areas.
- b. Hydraulic seeder.
 - (1) Applies seed, mulches, and fertilizer in a hydraulic spray.
 - (2) Works well on steep slopes.
 - (3) Demands large amounts of water.
 - (4) Seeding should be done separately from the mulching process (poor soil-seed contact).
- c. Power mulcher.
 - (1) Plows dry fiber mulch (hay or straw).
 - (2) Covers up to 60-70 feet in any direction.
 - (3) Three to four people are needed to operate.
 - (4) Subject to problems associated with high winds.
- d. Rangeland drill.
 - (1) Adapted to rocky or rough terrain.
 - (2) Little seedbed preparation is needed.
 - (3) Relatively maintenance free.
 - (4) Designed for use on gentle to moderate slopes.
- e. Tree spade.
 - (1) Dig, ball, and transport trees up to a 66 foot ball.
 - (2) 15 percent slopes or less.
- f. Culti-packer.
 - (1) Firm seedbeds prior to planting.
 - (2) Uniform compaction is difficult to achieve.
- g. Hydrostatic shredder.
 - (1) Crushes, chops, and shreds woody vegetation.
 - (2) Up to six inch diameter trees.
 - (3) 60-inch wide rotor, cuts to ground level.

(3) Can treat slopes up to 45 percent.

(4) Can not adequately treat in brushy areas.

b. Hydraulic method.

(1) Applies sand, mulch, and fertilizer in a hydraulic spray.

(2) Works well on steep slopes.

(3) Demands large amounts of water.

(4) Seeding should be done separately from the mulching.

erosion (poor soil-seed contact).

c. Power mulcher.

(1) Gives dry fiber mulch (hay or straw).

(2) Covers up to 50-75 feet in any direction.

(3) Trees to four feet are needed to operate.

(4) Subject to problems associated with high winds.

d. Hand-applied fiber.

(1) Adapted to rocky or rough terrain.

(2) Little seeded preparation is needed.

(3) Relatively maintenance free.

(4) Designed for use on gentle to moderate slopes.

e. Tree spade.

(1) Dig, ball, and transport trees up to a 60 foot ball.

(2) 45 percent slopes or less.

f. Ball-packer.

(1) With seedbed prior to planting.

(2) With no seedbed as difficult to achieve.

g. Hydraulic method.

(1) Crushes, chops, and breaks down vegetation.

(2) Up to six inch diameter trees.

(3) 60-inch wide rotor, runs to ground level.

2. Reseeding.

a. Topsoil preparation.

- (1) Graded to conform to adjacent terrain.
- (2) Rip subsoil--reduces slippage.
- (3) Harrow, disc, furrow, goupe, etc., topsoil.
- (4) Snow fences.

b. Species selection.

- (1) Special adaptation (past versus present).
- (2) Germination and establishment requirements.
- (3) Synecology (environmental relationships).
- (4) Functional utility and availability.
- (5) Number of species selected (yield, phenology, and diversity).
- (6) Consider competitive relationships (competitive exclusion).

c. Seeding considerations.

- (1) Rates--monitor relative to the vigor of species in mix.
- (2) Cool and warm season vegetation must be combined.
- (3) Special concern for warm season species (two phase seeding).
- (4) Too heavy versus too light seeding rates.

d. Mulches.

- (1) Protect from raindrop impact.
- (2) Reduces runoff-erosion.
- (3) Retains moisture.
- (4) Straw/hay are most common (native seed sources).
- (5) Mulch should be incorporated into the soil with use of a crimper.
- (6) Live mulches work well (pioneer crop).
- (7) Companion crop, i.e., interseeded annual crop.
- (8) Wood fiber mulch on steep slopes.

2. Objectives

- (1) To determine the effect of different treatments on the growth of the plants.
- (2) To determine the effect of different treatments on the yield of the plants.
- (3) To determine the effect of different treatments on the quality of the plants.
- (4) To determine the effect of different treatments on the survival of the plants.

3. Materials and Methods

- (1) Selection of the plants to be used.
- (2) Preparation of the different treatments.
- (3) Application of the different treatments to the plants.
- (4) Measurement of the growth, yield, and quality of the plants.
- (5) Statistical analysis of the results.

4. Results and Discussion

- (1) Effect of different treatments on the growth of the plants.
- (2) Effect of different treatments on the yield of the plants.
- (3) Effect of different treatments on the quality of the plants.
- (4) Effect of different treatments on the survival of the plants.

5. Conclusions

- (1) The different treatments had a significant effect on the growth, yield, and quality of the plants.
- (2) The different treatments had a significant effect on the survival of the plants.
- (3) The different treatments had a significant effect on the yield of the plants.
- (4) The different treatments had a significant effect on the quality of the plants.

- (5) The different treatments had a significant effect on the survival of the plants.
- (6) The different treatments had a significant effect on the yield of the plants.
- (7) The different treatments had a significant effect on the quality of the plants.
- (8) The different treatments had a significant effect on the survival of the plants.

e. Seeding techniques.

- (1) Drilling: (20 seeds per square foot).
- (2) Broadcasting: (2 x 20 seeds per square foot).
- (3) Depth: $\frac{1}{4}$ - $\frac{1}{2}$ inch, just cover small seeds.
- (4) Seed along contour, across prevailing wind.
- (5) Time: After October 15 or prior to April 15.
- (6) Not during frozen soil conditions.
- (7) Drilling versus broadcasting.
 - (a) increased soil cover.
 - (b) Improved germination conditions.
 - (c) Less loss to wildlife.
 - (d) Can reduce seeding rates with increased consistency.
 - (e) Precise seeding calibration.
 - (f) No difficulty under windy conditions.
- (8) Broadcasting versus drilling.
 - (a) Less expensive.
 - (b) Can be done in steep/rough terrain.
 - (c) Compatible with various seedbed preparation.
 - (d) Most successful immediately following grading.
 - (e) More successful when seed mix contains seeds having numerous seed sizes with different depth requirements.
- (9) Late fall versus early spring (northern regions)
 - (a) Cold stratification adaptations.
 - (b) Seed placement prior to earliest times of favorable weather.

- (1) Drillings (10 seeds per square foot)
- (2) Broadcastings (25 x 10 seeds per square foot)
- (3) Depth: 2-4 inches, from cover small seeds.
- (4) Seed along contour, across prevailing wind.
- (5) Time: After October 15 or prior to April 15.
- (6) Not during adverse soil conditions.
- (7) Drilling versus broadcasting.
 - (a) Increased soil cover.
 - (b) Improved germination conditions.
 - (c) Less loss to wildlife.
 - (d) Can reduce seedling rates with increased consistency.
 - (e) Increased seedling establishment.
 - (f) No difficulty under windy conditions.
- (8) Broadcasting versus drilling.
 - (a) Less expensive.
 - (b) Can be done in steep rough terrain.
 - (c) Compatible with various seeded preparation.
 - (d) Most successful immediately following grazing.
 - (e) More successful when seed mix contains seeds having numerous seed sizes with different depth requirements.
- (9) Late fall versus early spring (northern regions).
 - (a) Cold stratification requirements.
 - (b) Seed placement prior to earliest class of favorable weather.

- (c) Minimize seed depredation to rodents/birds which hibernate or migrate.
- (d) Generally more favorable conditions exist in fall than spring (operation of equipment, etc.).
- (e) May be a disadvantage during winter compaction.

f. Irrigation.

- (1) Limited irrigation provided (advantages).
 - (a) Reliable moisture source.
 - (b) Flexibility in planting periods.
 - (c) Promotes the germination and development of the more difficult warm season species.
- (2) Limited irrigation (disadvantages).
 - (a) Plant communities dominated by mesophytes.
 - (b) Plant communities dominated by phenotypes having shallow root systems.

g. Fertilization.

- (1) Northern Great Plains soils are commonly low in nitrogen and phosphorus.
- (2) Cool season plants generally have better response to nitrogen addition than warm season species.
- (3) Legumes respond best to phosphorus input.
- (4) Optimum plant diversity--light nitrogen addition.
- (5) Optimum biomass production--heavy nitrogen addition.
- (6) Phosphorus (immobile) should be mixed into soil prior to seeding--at the root zone to benefit plants.
- (7) Nitrogen will leach into root zone.
- (8) Soil analysis will provide for exact fertilizer application recommendations.

(c) Stimulate seed germination to control/bring which

difficult to migrate

(d) Generally more desirable conditions exist in fall

than spring (operation of equipment, etc.)

(e) May be a disadvantage during winter operation.

2. Irrigation.

(1) Limited irrigation provided (advantages).

(a) Reliable water source.

(b) Flexibility in planting periods.

(c) Provides the foundation and development of the

soil profile with season species.

(2) Limited irrigation (disadvantages).

(a) Plant communities dominated by mesophytes.

(b) Plant communities dominated by phenotypes having

shallow root systems.

3. Fertilization.

(1) Northern Great Plains soils are commonly low in

nitrogen and phosphorus.

(2) Cool season plants generally have better response to

nitrogen addition than warm season species.

(3) Legumes respond best to phosphorus input.

(4) Optimum plant diversity--light nitrogen addition.

(5) Optimum biomass production--heavy nitrogen addition.

(6) Response (immediate) should be mixed into soil prior

to seeding--at the root zone to benefit plants.

(7) Nitrogen will leach into root zone.

(8) Soil analysis will provide for exact fertilizer

application recommendations.

Visual quality will not come about accidentally or incidentally. It must be sought out, planned for, and incorporated fully into the design. It must have a place in the give and take that precedes all location and design decisions. A place along with other factors such as safety, operational efficiency, capital costs, and user costs.

AMEN

Visual quality will not come about accidentally or incidentally. It must be sought out, planned for, and incorporated fully into the design. It must have a place in the give and take that precedes all location and design decisions. A place along with other factors such as safety, operational efficiency, capital costs, and cost costs.

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